

POSTAL OUTGOING AND REPLY ENVELOPE FORM SYSTEM

This application claims the benefit of U.S. Provisional application number
5 60/120,190 file February 16, 1999, which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. TECHNICAL FIELD

The present invention relates to postal envelopes, and more particularly to a postal
10 envelope form system that has both outgoing and return address information printed by
an impact printer on both the outgoing and reply envelopes in one pass, utilizes white
areas and colors to improve scan and delivery accuracy, and positions delivery point
barcode outside an area typically smeared by post office processing equipment.

As is well known, the postal service employs automated mail processing systems
15 to facilitate the handling, sorting and delivery of various types of mailers including
envelopes. These automated systems employ codes and electronic code reading devices
to effect more efficient and accurate mail processing, improve consistency of delivery,
lower postal operating costs and increase savings to postal customers.

Numerical mail processing codes corresponding to the address delivery point and
20 now ZIP (Zone Improvement Program) codes are commonly used on envelopes. ZIP
coded envelopes without other codes are sent through a postal station where the alpha and
numerical ZIP codes are electronically scanned by an optical character reader (OCR) and
a processing or sorting code, presently a delivery point barcode in the form a series or

pattern of vertical short and tall bars and which corresponds to the individual numerical code, is applied to each envelope. The barcoded envelopes are passed through a barcode reader (BCR) which electronically reads the barcodes, and a barcode sorter (BCS) to automatically sort the envelopes according to their delivery point barcodes or address destinations.

Reply envelopes that are mailed inside of originating or outgoing envelopes by senders such as businesses and other organizations are now often preprinted (i.e., before mailing) with barcodes. The barcode for reply envelopes for a given organization can be readily printed by the sender when the reply address and any other matter is printed on each of the reply envelopes, since the reply address and barcode are the same for each such reply envelope. By preprinting the barcode on the reply envelopes, the reply envelopes do not have to be passed through the OCR and encoder to be barcode by the postal service, and this can result in cost savings to both the sender and the postal service. Some organizations are preprinting barcodes on outgoing envelopes so that even further savings can be realized under certain circumstances with prebarcoded mail.

When the sender preprints the barcode on the reply envelope, another processing or identification code, presently known as a facing identification mark (FIM), can also be preprinted to provide machine detectable codes for the automatic facing and cancellation of reply mail postage, as well as to identify prebarcoded reply mail early in the postal processing system. Different FIM marks are presently used for identifying: (1) "business reply mail without barcode, and Penalty Mail or Franked Mail"; (2) "courtesy reply with barcode and affixed stamp"; and (3) "business reply with barcode and Penalty or Franked Mail". There is a unique FIM mark available for each type of business reply

mail described above. Such FIM marks are typically in the form of a series of parallel vertical lines printed by the sender in the upper right portion of the mail piece just left of the indicia or stamp position.

The use of outgoing envelopes containing reply envelopes are, however, relatively expensive since two separate and complete envelopes are required, and both envelopes must be printed separately with addresses.

Furthermore, self-mailer forms are typically printed on expensive printers. Inexpensive printers generally could not properly print self-mailer form. These types of printers include narrow carriage impact printers which are known for a relatively weak printer head punch striking force. This weak striking force causes problems in properly imaging information through to the reply envelope and other parts of an envelope form system.

Additional problems are associated with the current requirements for today's postal standard first class business mail with a business reply envelope. These postal requirements include: (1) complete delivery point postal barcoding on all outgoing envelopes; (2) complete delivery point postal barcoding on the business reply envelopes; (3) a scannable face identification mark (FIM) on the business reply envelope; and (4) a minimum of 70% of the mail delivery point barcoding must be scannable in 1998, 1999's goal is 80%. The Post Office requirements increase in the year 2000, and for years beyond. Specifically, in the year 2000, the scanability of postal barcoding must be at least 90% accurate.

2. DESCRIPTION OF RELATED ART

Although there are many self-mailer form arrangements, there are no known arrangements that preprint both mail-to (i.e., outgoing) and return addresses on both the outgoing and reply envelopes.

5 Additionally, there are no known arrangements for a self-mailer that is entirely imaged all the way to and including the response envelope, while meeting upcoming postal standards required in the year 2000.

Of the arrangements that are known, none designed for narrow width impact printers is able to take advantage of all the best postal discounts while imaging complete information on a small format.

10 The inventor of the present application attempted to meet such a challenge in 1997. The inventor applied for and obtained a copyright in 1997 on an early version on subject matter similar to that of the present invention. However, that earlier version did not work for its intended purpose, and the present invention has many distinguishing features over the earlier version, which will be referred to hereinafter as the '97 form.

15 First, the '97 form failed the post office goal of 70% scan accuracy. Failing this test required a major redesign. For instance, the '97 form was unable to accommodate delivery point barcoding, due to the width available for the mail-to address area, in light of the widths required for other areas and the limitations associated with designing a form for narrow width carriage impact printers. Additionally, the '97 form was unable to
20 accommodate a face identification mark (FIM) on the reply envelope which is required for the best postal discounts (e.g., six cents per envelope cheaper when FIM marks are used). Also, the outgoing and reply envelopes of the '97 form had patterned carbon spots in the mail-to address area that were later discovered to be narrower than the address area

in front of it. This arrangement of carbon caused errors in reading or scanning the delivery point barcodes. Furthermore, the '97 form reply envelope front panel allowed the contents of the reply envelope (e.g., checks, receipts or remittance copies) to show through the front of the envelope and interfered with accurately scanning the reply envelope. Still further, there were limited white areas among color coded forms. The white areas were discovered later as greatly improving accuracy of readability (by both humans and machines) due to better contrast with information printed therein. The '97 form also had a fast-tab, used for opening the outgoing envelope, opening in a direction in which postal processing equipment normally runs so that the equipment was damaging or opening the envelope. Lastly, the weights of paper used were not disclosed in the '97 copyright disclosure, let alone the change in paper weights arrived at and discussed below in conjunction with the invention. The '97 form thus did not work for the purposes intended for the invention discussed below. Furthermore, in light of all the great many differences, the '97 form, taken alone or in combination with other prior art, fails to provide the many advantages of the postal envelope form system of the present invention that has developed to date.

Therefore, the related art leaves a need for an arrangement that accommodates for narrow carriage impact printers having a width no greater than approximately ten inches.

There is also a need for an arrangement that is more accurate in reading postal barcodes.

There is a need for an arrangement that is barcoded and able to be successfully read after being processed through the post office envelope processing system.

There is a need for an arrangement that reduces damage caused by normal processing as a result of the post office envelope processing system.

There is also a need for a postal envelope form system that provides complete information to the user and their customer.

- 5 There is also a need for an arrangement that addresses health issues associated with the repetitive task of bursting the envelope form system by hand.

There is a need for an arrangement that weighs no more than one ounce and is within size dimensions established by post office standards.

- 10 There is a need for preventing contents of text preprinted on sheets contained within an envelope from interfering with image contrast or scanning which causes misreading of envelopes and a loss of best postal discounts.

There is a need for preventing misdelivery of mail caused by a large volume of reply mailers all looking the same and being mistakenly delivered to incorrect mailing addresses.

- 15 There is also a need for a postal envelope form system that is versatile, and addresses the needs of the user and customer, the impact printer limitations and postal requirements of today and the foreseeable future.

SUMMARY OF THE INVENTION

The needs mentioned above, and other needs, are met by the present invention.

- 20 According to one aspect of the present invention, a postal envelope form system is provided comprising an outgoing envelope and a reply envelope contained within the outgoing envelope, wherein the envelopes each have a mail-to address and a return address preprinted thereon.

According to another aspect of the invention, the outgoing envelope further comprises a flap enclosure and a tab opening means for easily opening the flap enclosure, wherein the tab opening means is located at a bottom of the outgoing envelope thereby allowing the return address to be located at a top of the outgoing envelope and the customer return address to be located at a top of the reply envelope. This aspect allows the return addresses to be positioned at an uppermost portion of the envelope to free up valuable space which is used for including complete information on each of two portions of a statement.

Another aspect of the invention provides that the outgoing and the reply envelopes each have delivery point barcodes which identify the intended location for delivering the envelopes, and the reply envelope includes a facing identification mark. These aspects allow the postal envelope form system to qualify for better postal discounts.

Yet another aspect of the invention provides for sheets having a front face and a right side edge, and the sheets are fixed together at the right side edge to strengthen the postal envelope form system at a location where postal processing equipment engages the postal envelope form system during processing.

A still further aspect of the invention provides a top portion of the mail-to address area positioned relative to postal equipment that contacts the envelopes to feed the envelopes through a postal envelope processing system such that the delivery point barcode is left substantially uncontacted to thereby reduce smearing of the delivery point barcode.

Yet another aspect of the invention provides the postal envelope form system with sheets that comprise a twelve-and-a-half pound selectively carbonized bond original sheet positioned on top of, a sixteen pound selectively carbonized bond outgoing envelope face sheet positioned on top of, a sixteen pound selectively carbonized bond billing statement sheet positioned on top of, a twenty-four pound register bond reply envelope face sheet positioned on top of, a twenty pound register bond reply envelope back sheet positioned on top of, a twenty pound register bond outgoing envelope back sheet. This unique combination of paper types and weights enables information to be imparted through the several sheets using conventional narrow carriage impact printer which typically do not have a tremendous amount of striking force. This unique combination of paper types and weights combine to make a very strong and durable piece that will withstand the post office equipment punishment.

A still further aspect of the present invention provides a method of making a postal envelope form system, comprising: printing a plurality of sheets, wherein at least some of the plurality of sheets have a selectively carbonized area to enable transfer of information between sheets; attaching the plurality of sheets together so as to form an outgoing envelope, and a reply envelope contained within the outgoing envelope, and wherein each of the outgoing and reply envelopes are able to have mail-to and return addresses preprinted thereon using the selectively carbonized area. These aspects allow forms to be created which will have complete information provided on various portions of the postal envelope form system using a conventional narrow carriage impact printer.

Another aspect of the invention provides a business method using a postal envelope form system, the method comprising: printing information on the postal

envelope form system, the information including billing information; mailing an outgoing envelope having pre-preprinted first mail-to and return addresses, the outgoing envelope having contained therein a reply envelope having preprinted second mail-to and return addresses. Having preprinted reply envelope mail-to, delivery point barcode and return addresses along with a FIM mark allows for postal discounts to be qualified for.

A further aspect of the invention provides preprinting textual information intended for being scanned by post office processing equipment in white areas located among colored areas to facilitate accurate delivery. This increases the accuracy in delivery since the high contrasting white areas contain the text required for scanning.

This also allows color coding to distinguish between similar self-mailers from being misdelivered to an incorrect address based on appearance. White areas on the outgoing and reply envelopes are 2/10" wider and taller than the matching text area shown on part 1 to increase tolerance in collating the several sheets, and thereby ensure information to be scanned is located within high contrast areas.

Yet another aspect of the invention provides a business method using a postal envelope form system, the method comprising: receiving a first envelope having preprinted first mail-to and return addresses, the first envelope having contained therein a second envelope for reply having preprinted second mail-to and return addresses, and providing at least one of payment and payment information, and mailing the reply envelope along with at least one of payment and payment information. These aspects allow users of the invention to readily return payment in compliance with postal requirements. A similar advantage is realized by the following aspect of the invention which provides a business method maintaining a relationship, the method comprising:

receiving at least one of a good and service; and receiving a first envelope having preprinted first mail-to and return addresses, the first envelope having contained therein a billing statement associated with at least one of a good and service, and a second envelope for reply having preprinted second mail-to and return addresses.

5 An additional aspect of the present invention provides that the outgoing envelope further comprises a flap enclosure and a tab opening means for easily opening the flap enclosure, wherein the tab opening means is located at a bottom of the outgoing envelope thereby allowing the biller return address to be located at a top of the outgoing envelope and the customer return address to be located at a top of the reply envelope.

10 Yet another aspect of the invention provides a method of making a postal envelope form system comprising the steps of: printing a plurality of sheets, some of which have selectively carbonized areas used for transferring information impact printed thereon to a sheet underneath; forming lines of weakness in the plurality of sheets to allow easy separation of a billing statement from a reply envelope, both contained within
15 an outgoing envelope; and gluing the plurality of sheets together to form the postal envelope form system. These aspects allow for both easy separation of form portions, while providing a reinforced edge that typically receives damaging treatment from postal processing equipment.

20 A still further aspect of the invention provides for forming a line of weakness transverse to a height of the postal envelope form system thus creating a series of connected, but weakened, individual postal envelope form systems. This aspect allows for fast automated printing of a plurality of forms sequentially.

Additional objects, advantages and novel features of the invention will be set forth in, or apparent from, the following detailed description of the preferred embodiments of the invention.

5 BRIEF DESCRIPTION OF THE DRAWINGS

Reference is made to the attached drawings, wherein elements having the same reference numeral designations represent like elements throughout.

Figure 1 is a perspective view of a postal envelope form system, and depicts several parts that are attached together to form an embodiment of the present invention.

10 Figure 2 is a block diagram of Part I which forms an originating sheet of the postal envelope form system of the present invention, and depicts a front face having colored areas and white areas, and shows carbon spots of a back face in cross-hatching.

Figure 3 is an actual copy of the front face of Part I, and depicts placement of text within the various blocks shown in Figure 2.

15 Figure 4 is a block diagram of a front face of Part II, which forms a portion of an outgoing envelope of the postal envelope form system of the present invention, and depicts colored and white areas on the front face, and shows carbon spots of a back face in cross-hatching.

20 Figure 5 is a block diagram of a front face of Part III, which forms a billing statement of the postal envelope form system of the present invention, and depicts colored areas and white areas.

Figure 6 is a block diagram of a back face sheet of Part III of the billing statement shown in Figure 5, and depicts colored areas, and shows a front view of carbon spots in patterned cross-hatching.

Figure 7 is a block diagram of a front face of Part IV, which forms a portion of a
5 reply envelope of the postal envelope form system of the present invention, and depicts colored areas, and white areas which are a mirror image of carbon spots shown in Figure 6.

Figure 8 is a block diagram of a back face of Part IV, which forms the same portion of the reply envelope shown in mirror image of Figure 7, and depicts security
10 screened areas, and shows block-out areas in solid dark blocks.

Figure 9 is a block diagram of a front face Part V of the back of reply envelope, and depicts a security screened area.

Figure 10 is a block diagram of a back face of Part V, which is the outside of another portion forming the reply envelope, and depicts colored area and printed
15 directions.

Figure 11 is a block diagram of a back face of Part VI, which is the outside of another portion of outgoing envelope shown in Figure 4, and depicts colored areas, directions and a fast pull tab for opening.

20 DETAILED DESCRIPTION OF THE INVENTION

Figure 1 is a perspective view of a postal envelope form system 10. System 10 comprises several sheets or parts that are attached together to form an embodiment of the present invention. System 10 is intended to be used as a self-mailer billing system where

an outgoing envelope is mailed to a customer along with billing information and a reply envelope is to be used to return payment or payment information in exchange for goods or services rendered.

The several sheets shown in Figure 1 include a Part I 100 which is attached to a Part II 200, which is attached to a Part III 300, which is attached to a Part IV 400, which is attached to a Part V 500, which is in turn attached to a Part VI 600. Part I 100, Part II 200, Part III 300, Part IV 400, Part V 500, and Part VI 600 are attached on right side edge in order to strengthen portions of system 10 that undergo postal processing by processing equipment used in delivery of mail.

Part I 100 is formed from a sheet of twelve-and-a-half pound selectively carbonized bond paper. The twelve-and-a-half pound designation is commonly understood in the paper and forms-processing industry as corresponding to the weight of 1000 sheets of a specific size of paper. The selective carbonization is dependent on the location of information printed on Part I 100 which is intended to be imparted onto other parts attached underneath. This will be described more fully below.

Part II 200 is formed from a sheet of sixteen pound selectively carbonized bond paper. Part III 300 is formed from a sheet of sixteen pound selectively carbonized bond paper. Part IV 400 is formed from a sheet of twenty-four pound register bond paper, which is similar to carbonized bond with one exception that carbon is not attachable to the register bond paper as readily as with the carbonized bond paper. Part V 500 is formed from a sheet of twenty pound register bond paper, and Part VI 600 is formed from a sheet of twenty pound register bond paper.

Part II 200 and Part VI 600 are attached together to form an outgoing envelope 20 which is readily separable from the other attached parts of system 10 as will be described in detail below. Outgoing envelope 20 encloses Part III 300, Part IV 400, and Part V 500.

5 Part IV 400 and Part V 500 are attached together to form a reply envelope 30 which is readily separable from the other attached parts of system 10 as will be described in detail below. Part IV 400, being made of thicker and heavier paper, provides significant strength to both the reply envelope 30 and outgoing envelope 20 which assists in preserving postal envelope form system 10 upon encountering processing machinery.

10 Additionally, attaching Parts I-VI by gluing right side edge bolsters the durability of postal envelope form system 10 which typically progress through postal processing machinery with the right edge leading the remainder of the Parts.

Figure 2 is a block diagram of Part I 100 which forms an originating sheet of the postal envelope form system of the present invention. Part I 100 is the originating sheet upon which a printer prints information. The postal envelope form system 10 was 15 designed for use with a relatively inexpensive impact printer (not shown) having a narrow carriage (e.g., Okidata Microline 320 Turbo). These types of printers are common in the industry due to their low cost and reliability.

The information printed by such printers includes billing information identifying 20 the goods or services rendered, the time period covered, mailing information, and postage information, which are discussed further below. Part I and originating sheet will be used interchangeably hereinafter with reference to numeral 100.

Figure 2 depicts originating sheet 100 as having a colored area 101 among various and white areas that will be discussed individually. Reference is made to originating sheet 100 in conjunction with other parts throughout the remaining discussion.

Specifically, originating sheet 100 includes a sender return address area 102 within which a sender return address is printed before mailing (i.e., preprinted). Figure 2 also shows in cross-hatching a carbon spot 102a located on a back face (not shown) of originating sheet 100. Carbon spot 102a enables the force of the impact printer used to impart information onto the sheet immediately below originating sheet 100, which is Part II 200.

Therefore, originating sheet (Part I) 100 is printed with the information that is intended to be printed on sheets beneath it. Thus, originating sheet (Part I) is preprinted with all the information printed on system 10. Originating sheet 100 also includes customer mailing address area 104 within which a customer mail-to address is printed before mailing along with a delivery point barcode discussed further in conjunction with Figure 3 below. Figure 2 also depicts in cross-hatching a carbon spot 104a that is located on a back face (not shown) of originating sheet 100. Carbon spot 104a enables the force of the impact printer used to impart information onto Part II 200, which is the face of outgoing envelope 20.

Originating sheet 100 also includes a postage permit area 106 within which postage permit information is printed before mailing. The postage permit information is that which the post office uses in assigning a postage charge and postage discounts to the sender.

Figure 2 also depicts in cross-hatching a carbon spot 106a that is located on a back face (not shown) of originating sheet 100. Carbon spot 106a enables the force of the impact printer used to impart information onto Part II 200, which is the face of outgoing envelope 20.

5 Originating sheet 100 is approximately five-and-a-half inches tall and nine-and-five-eighths inches wide, which fits within narrow carriage impact printers that are typically approximately ten inches wide. Generally, forms similar to postal envelope form system 10 are approximately nine-and-a-half inches wide. However, system 10 was made an eighth of an inch wider to accommodate areas large enough to include
10 reasonable amounts of information, yet still fit within size dimension standards of the post office. The half inch tolerance typically provided was necessary for other forms, but the form of system 10 is able to reduce this by $1/8^{\text{th}}$ of an inch due to painstaking engineering efforts. This allowed the width of system 10 to be increased to $9 \frac{5}{8}^{\text{th}}$ of an inch, and therefor implement the advantages system 10 has over conventional forms.

15 Since originating sheet 100 includes all the information printed on the various other parts of system 10, originating sheet 100 is useful for keeping records of the sender. Furthermore, originating sheet 100 incorporates a line of weakness or perforation 107 transverse to the width that allows a portion 107a to be separated from a portion 107b. Portion 107a can be used in a business method as a reminder billing statement, while
20 portion 107b can still be retained for record keeping purposes. Thus, originating sheet 100 can be used as a reminder bill or a collection bill, with both a customer receipt and a remittance copy.

Figure 3 is an actual copy of the front face of originating sheet (Part I) 100, and depicts placement of text within the various blocks shown in Figure 2. Specifically, sender return address area 102, customer mailing address area 104, and postage permit area 106 are shown with text contained therein. Sender return address area 102 has a return address shown, but with the name of the sender removed for confidentiality purposes. The name of the sender is actually printed uppermost in sender return address area 102. Similarly, customer mailing address area 104 and postage permit area 106, have information printed uppermost in the areas 104 and 106. In the case of customer mailing address area 104, the uppermost information is delivery point barcoding 108 that allows certain postage discounts to be credited to the mailer of outgoing envelope 20 upon which the barcoding 108 is transferred. A series of circular cuts 109 are located on each side of system 10, in parallel, to form pin-feed margins that assist printers in feeding forms through a printing path during printing.

Figure 4 is a block diagram of a front face of Part II, which forms a portion of an outgoing envelope 20 upon which the information in the sender return address area 102, the customer return address area 104, and postage permit address area 106 are imparted by the impact printer. Figure 4 depicts a colored area 202 within which white areas 102', 104', and 106' are located. White areas 102', 104', and 106' correspond to the sender return address area 102, the customer return address area 104, and postage permit address area 106 of originating sheet (Part I) 100. Note boxes 102', 106' and 104' on Figure 4 are much larger than their corresponding twin images on Figure 3. This is necessary to insure scanability.)

The colored areas 202 provide a visual indication that allows outgoing envelopes sent by the same sender to be easily identified with the sender. The colored areas of all parts of system 10 can be kept the same, or varied if desired, to create meaning associated with the colors. For example, all the colored areas of system 10 can be kept the same color to associate various parts being mailed at different times in reply with a particular mass outgoing mailing. Alternatively, various parts can be differently colored to provide an visual indication of which part among system 10 is being seen without having to refer to the contents of the part.

The white areas are purposefully not colored to enable the information printed within to be easily read by users and scanning equipment associated with postal envelope form system 10. The information within the white areas is transferred from Part I 100 to Part II 200 is achieved through the selectively positioned carbon spots 102a, 104a, and 106a located on the back face of Part I 100.

Figure 4 also depicts carbon areas 204, 206 and 208 which transfer information imparted by the impact printer onto originating sheet (Part I) 100 and through to a billing statement sheet (Part III) 300 (Figure 5). The information imparted by the impact printer onto originating sheet (Part I) 100 and that is transferred to billing statement sheet (Part III) 300, includes information contained within the sender return address area 102 and within the customer mailing address area 104. The information additionally includes that within a customer return address area 110, a distributor or sender mailing address area 112, a response detail area 114, and a message area 116.

The information contained within customer return address area 110 is transferred by carbon spot 204 to billing statement (Part III) 300 within a customer return address

area 310 shown in Figure 5. Figure 5 is a block diagram of a front face of Part III, which forms a billing statement of the postal envelope form system of the present invention, and depicts colored areas 350 among which white areas such as customer return address area 310 are located. Other white areas located among colored areas 350 include a sender return address area 302, a customer mailing address area 304, a sender mailing address area 312, a response detail area 314, and a message area 316. The same information imparted to originating sheet (Part I) is imparted to billing statement (Part III) 300, with the exception of the postage permit 106 and a face identification mark (FIM) discussed below. Thus, billing statement (Part III) 300 contains complete information.

Figure 5 additionally includes directions 320 that in the embodiment shown instruct the recipient of billing statement (Part III) 300 to "Please return this portion with your response. Thank You!". The portion requested for return is a remittance copy 360, which is separated by a line of weakness (perforation line) 362 from a customer copy 364. Thus, a business method is established by which a customer can retain customer copy 364 as a courtesy when the customer returns the remittance copy 360 with payment or payment information in reply to receiving billing statement (Part III) 300.

Figure 6 is a block diagram of the back face of billing statement (Part III) 300 shown in Figure 5. Figure 6 depicts a front view of this back face billing statement (Part III) 300, and shows carbon spots in patterned cross-hatching among a colored area 401.

The carbon spots in Figure 6 are selectively positioned to correspond to the location of information imparted by the impact printer on originating sheet (Part I) 100 and to be transferred to similarly positioned areas on reply envelope 30 shown in Figure 7.

Originating sheet (Part I) 100 further includes a face identification mark (FIM) area 140 that corresponds to a carbon spot 640 in Figure 6. It should be noted that Figure 6 is a back view of billing statement (Part III) 300, and is therefore a mirror image of the positioning of FIM area 140. Similarly, Figure 6 includes a distributor mailing address area 612 which is a mirror image of the positioning of distributor mailing address area 112 shown in originating sheet (Part I) 10 (Figures 2 and 3). The distributor mailing address area 612 is a carbon spot that imparts the address information of the sender of the outgoing envelope shown in Figure 7. Figure 6 also includes a carbon spot 610 that corresponds in mirror image to customer return address area 110 shown in Figures 2 and 3.

Figure 7 is a block diagram of a front face of Part IV, which forms a portion (the front sheet) of reply envelope 30 of the postal envelope form system of the present invention. Figure 7 depicts colored area 701, and white areas which are a mirror image of carbon spots shown in Figure 6. Specifically, Figure 7 shows a customer return address area 710, a distributor mailing address area 712, and a FIM mark 740 as white areas. Note boxes 710, 712 and 740 on Figure 7 are much larger than their twin image on Figure 3. This is necessary to ensure scanability. The white area provides high contrast with the information contained therein which was imparted by the carbon spots 610, 612, and 640 shown in Figure 6. Figure 7 is a front view of reply envelope 30 and therefore the positions of areas 710, 712, and 740 match with the positions of areas 110, 112, and 140 shown in Figure 1; whereas the areas 610, 612, and 640 of Figure 6 are mirror imaged in comparison because Figure 6 is a back view.

Figure 7 also includes direction area 750 which in this embodiment instruct the user of reply envelope 30 to "PLACE STAMP HERE The Post Office will not deliver mail without Postage." The postage placed at or near direction area 750 is cancelled by post office processing equipment. The inclusion of FIM 740 and a delivery point barcode in address area 712 on reply envelope 30 allows the user of postal envelope form system to qualify for additional postage discounts credited upon payment for mailing outgoing envelope 20, as long as other criteria are met. The other criteria include a threshold readability or accuracy level above which a percentage of the mailings sent by users must surpass. In the year 2000, 90% postal barcoding contained in mail-to address areas such as address area 712 must be scannable by postal processing equipment. If the 90% threshold is not meet, the discounts on postage are not given. These discounts can be approximately six cents per envelope which is quite significant when using business mailers to solicit payment for goods or services rendered from a very large number of customers.

Figure 8 is a block diagram of a back face of Part IV, which forms the same portion of the reply envelope shown in mirror image of Figure 7. Figure 8 depicts security screened areas 802, and shows block-out areas in solid dark blocks 810, 812 and 840 which correspond to areas 710, 712 and 740 in Figure 7. The security screened area 802 prevents information contained within reply envelope 30 from being either read or scanned through the paper of envelope 30. Dark blocks 810, 812 and 840 enhanced the scanability of the reply envelope address data in white block's 710, 740 and 712. Blocks 810, 812 and 840 prevents any image of envelope contents or security pattern from showing through the front of the reply envelope. This prevents information contained in

the reply envelope under the areas of 710, 712 and 740 from being mistakenly scanned by postal processing equipment attempting to scan reply envelope 30. It has been found that errors in scanning were reducing the accuracy rate required to qualify for the best postage discounts.

5 Figure 8 also depicts a flap 880, formed by line of weakness 885 and edge 886, upon which moistenable glue is placed. Flap 880 can contain parallel lines of glue to better ensure that envelope 30 seals properly. Flap 880 also serves as a direction area. The directions in this embodiment instruct the user to "MOISTEN THIS FLAP, THEN FOLD FLAP OVER TO SEAL". Flap 880 folds about line 885 and attaches to the other

10 portion of envelope 30 formed by Part V 500. The directions in this embodiment also instruct the user to "Pull To Remove Contents". The removal instruction is for separating the reply envelope 30 (Parts IV and V) and billing statement 300 (Part III) from outgoing envelope 20. The separation is achieved in part due to lines of weakness formed before the various Parts I-VI are attached together. Specifically, line of weakness 883 is a

15 perforation that allows easy separation by simply pulling reply envelope 30 (Parts IV and V) and billing statement 300 (Part III) from outgoing envelope 20. Line of weakness 883 once completely weakened form the boundary of reply envelope 30 along with an

edge 886.

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04

Figure 9 is a block diagram of a front face Part V of the back of reply envelope

20 30. Figure 9 depicts a security screened area 900 that prevents sensitive information contained within reply envelope 30 from being easily read through the sometimes transparent sheets of paper forming the various Parts of postal envelope form system 10. An edge 902 is attached, such as by glue, to a correspond edge on the back of Part IV 400

shown in Figure 8. An edge 904 is left unattached so that an opening is formed in reply envelope 30.

Figure 10 is a block diagram of a back face of Part V, which is the outside of the other portion forming reply envelope 30. Figure 10 depicts colored area 1002 and printed direction area 1004. A flap 1006 formed by a line of weakness 1008 and an edge 1010 is glued to a front face of Part VI 600 so that when a tab of Part VI 600 is removed, flap 1006 is removed along with it. In the event that flap 1006 is not removed as intended, instructions reading "REMOVE THIS PROTECTIVE COVER AT PERFORATION TO EXPOSE GUMMED FLAP BELOW" clearly tell the user what to do. The gummed flap referred to is that flap 880 mentioned above in conjunction with Figure 8.

Figure 11 is a block diagram of a back face of Part VI, which is the outside of the other portion of outgoing envelope 20 shown in Figure 4. Figure 11 depicts a colored area 1102, a direction area 1104 and a fast pull tab 1111 for opening the outgoing envelope 20. Direction area 1104 instruct the recipient of outgoing envelope 20 how to operate fast pull tab 1111: "TO OPEN – LIFT TAB AND SLOWLY PULL TO YOUR RIGHT". Tab 1111 includes an unattached portion 1112 which can be lifted easily to grasp and pull tab 1111 at a line of weakness 1114. Although the instructions indicate that the user is to pull to their right, the tab is located on the bottom (and printed upside down) relative to the orientation of the writing on the front faces of outgoing envelope 20 and reply envelope 30.

This location and orientation of tab 1111 is significant in many respects. The location of tab 1111 on the bottom and back of outgoing envelope 30 (as oriented by the writing on envelopes 20 and 30) allows the return address areas of envelopes 20 and 30 to

be positioned at the uppermost edge since there is no interference with a conventionally placed folding closure flap. In other words, in conventional envelopes, the closure flap is placed at the top which would force the return address to be positioned only as high as the folding line. In the present invention, the position, location and orientation of tab 1111 does not force the return address of the outgoing envelope to be lowered. This allows a greater amount of information to be imaged on the various parts of postal envelope form system 10.

Furthermore, tab 1111 is constructed with unattached portion 1112 and perforation 1114 to reduce damage to the contents of outgoing envelope 20 such as ripping or tearing the billing statement (Part III) 300 or reply envelope 30.

Similarly, reply envelope 30 has flap 880 located at the bottom which allows the return address area 710 (Figure 7) to be positioned uppermost (within certain tolerances) on reply envelope 30. This allows a greater area for message areas 116 (Figures 2 and 3), message area 316 (Figure 5), and response detail areas 114 and 314.

Having fully described postal envelope form system 10 above, a few additional points should be made to elaborate on how system 10 came to be developed to provide certain advantages and meet various needs identified in the industry. First, narrow carriage impact printers have limitations that the design had to overcome, one being the maximum width of the form being ten inches. Second, the striking force of impact printer's print head limits the number and weight paper being used. Third, the print speed of narrow carriage printers is slow compared to other options.

The design of the present invention overcomes these limitations. The form is kept as small as possible to limit wasted motion of the print head, to fit within narrow carriage

impact printers, to fit size dimension standards of the post office, and to weigh approximately less than one ounce. Managing the strike force of the impact printer head was achieved by the combination of paper weights and characteristics. This management proved to be vital when addressing both narrow carriage printer capabilities and postal requirements.

Designing system 10 on a small format that provides complete information to both the businesses and their customer was very challenging. Yet, system 10 provides complete return address and mail-to address information on both the outgoing and the business reply envelopes 20 and 30. The billing statement (Part III) 300 has a vertical perforation that separates the sheet into remittance copy 360 and customer copy 364, both of which have complete information due to the careful positioning of areas throughout the various parts. The information on both portions includes: (1) name and address of sender; (2) name and address of customer; (3) detailed information on the customer copy; (4) response information on the billing statement; (5) account numbers on both portions; (6) postal barcoding on each envelope; and (7) the FIM mark on the reply envelope.

System 10 is very flexible in that it allows postage indicia to be printed thereon, or a stamp or metered postage to be used. FIM marks are not required on all mail, and system 10 allows FIM mark to be imaged or not imaged. When used, FIM marks have been tested in postal processing equipment and achieved a 99.9% readability rate. System 10 also allows postal barcoding to be printed when desired.

Furthermore, postal endorsements are required periodically and several options are available to post office customers. These endorsements come with various costs

charges by the post office and each one has differing verbiage. The post office requires use of such endorsements once every six months, however, postal customers using system 10 can use the endorsements monthly if they choose. Complete freedom of which endorsement is used, how frequently it is used, or use of a different endorsement on each mailing is possible using system 10. Additional flexibility is provided by choosing which color system 10 will be.

Contrast is an important element of being able to read the address and postal barcoding on the envelopes by the post office scanning equipment. System 10 takes advantage of this by focussing the scanner's attention to the vital data area. These areas are the mail-to address, return address, the FIM mark, and postage permit area. These areas are white only, or other highly contrasting combinations of colored area and colored information therein. The boxes that form these focal areas allow $1/10^{\text{th}}$ of an inch free space around the data image area. The post office standards require $1/25^{\text{th}}$ of an inch free space around all scannable data. Thus, system 10 exceeds these requirements. This is seen in originating sheet 100 where the colored portions are located between addresses 102 and 110, between areas 114 and 116, and between postage permit 106 and area 114. The balance of the surface is printed in an ink color which causes reduced contrast. The post office scanners find the data in the high contrast areas.

Locating the postal barcoding in the mail-to address areas in envelopes 20 and 30 is also very important. In a main embodiment, the barcode be the first line printed, and is located at the very top of the address box as seen in Figure 3 in areas 104 and 112. This moves the barcode up and out of the way of the post office handling equipment that is most viscous to the area which otherwise smudges the barcode. The positioning shown

in Figure 3 improved readability of the barcode from 60% to 98% after six passes through the postal equipment. The business reply envelope address is located above the outgoing address area which protects the barcode therein from similar damage. The reading results of the business reply envelope is 95% after going through the postal equipment 12 times.

Another important feature of system 10 is the block-out patterns which are printed on the inside of the envelopes. This prevents data or information contained within the envelope from being scanned and interfering with barcodes or address lines. The fine screened box of system 10 appears to be solid to scanners, so there is no mistaking a pattern as information.

The positioning of tab 1111 on the bottom backside of the envelope is also very important to the success of system 10. First, locating tab 1111 on the bottom of the envelope 30 permits variable information to be imaged to the very top of the form. This allow the complete form design to be moved up to the very top of the envelope. The top is the ideal position for the return address information for the outgoing and reply envelopes 20 and 30, FIM 740, and postal indicia 106. This change allows the postal barcode to be moved up out of the way of the post office equipment in order to limit damage and smearing to improve readability.

Orientation of tab 1111 was also very important to damage control resulting from post office processing equipment. Tab 1111 is best located behind the left side of the face of the envelope 20; in other words, on the right side facing the back of envelope 20. This orientation prevents the tab 1111 from accidentally being snagged and opened while traveling through the postal equipment.

Crumple damage control of the right vertical edge of system 10 is also important. Post office equipment has a catch or bar stop that blocks the envelope path when the envelope hits the stop. The impact of envelopes 20 and/or 30 against the catch can cause crumple damage to the mail piece. This damage can lead to the ordinary mailers being further damaged or destroyed by postal handling equipment. System 10 reinforces the right edge 40 to minimize crumple damage.

Lastly, the paper weights and characteristics have been selected very carefully after much research and experimentation. The combination described herein yields durability and strength, while allowing imaging through all parts. Other paper weight combinations can be used, as various other combinations have been tested. However, the combination of types and characteristics provided herein represent the best mode known to date.

In summary, system 10 provides readable by postal scanners of barcode on both outgoing and reply envelopes higher than the requirement established by the year 2000 goal of 90% accuracy. Solid blocks such as found blocks 840, 810 and 812 can also be applied to standard envelopes (e.g., only a single envelope not necessarily contained in a system) to improve postal scanning of alpha numeric address information. System 10 provides an ergonomic design of forms, which reduces injury to users hands and arms from repetitive manual bursting. This is accomplished this by weakening the pinfeed and between form perforations by using perforation that have wider cuts and narrower ties between perforations. This weak perforation requirement for the purpose of protecting the health of the user and the employees has never been accomplished before.

System 10 is extremely flexible and user friendly. For instance, customers can change addresses without concern of form cost.

System 10 establishes focal points on both outgoing and reply envelopes in the form of white boxes which contain the variable data in the form of to and from addresses, delivery point barcodes and FIM mark. These focal points helps the postal equipment to find, read and sort with a very high degree of accuracy approaching 100%.

Managing printer impact on system 10 to achieve a scan accuracy of almost 100% required careful selection of paper weights. The fundamentals of this invention can be applied to an unlimited array of form requirements and sizes. This system is very flexible.

While this invention has been described in connection with what is presently considered to be most practical and preferred embodiments, it is to be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims. For example, fewer than six parts could be used while still imparting substantially the same information on the number of parts actually used. Additionally, another embodiment of the present invention would replace the originating sheet with an electronically stored version of the information contained on the originating sheet, thereby allowing fewer than six parts to be used. Furthermore, it is envisioned that equivalents of the specific paper types and weights combinations could be readily used to achieve transfer of information through the number of parts used in an embodiment. Alternatively, when greater than six parts are used, adjustment of part weights and types are necessary to image through the parts, depending on printer strike force. Similarly, improvements in either impact printers and/or postal processing equipment in use may bring

about equivalent embodiments, as long as the printer used is able to legibly impart the information that is readable/scannable by the postal processing equipment.

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